Mini-annual report, Computer Science 2011

It is with great pleasure and pride that I once again can observe that the past year has been successful. Our researchers have asserted themselves in all the areas that we deal with: research, teaching, talent development and knowledge exchange. Therefore, I would like to extend a huge thank to all employees. Thanks to you and your efforts, the department is performing brilliantly.

40th anniversary

On 1 April 2011 the Department of Computer Science celebrated its 40th anniversary. The day was celebrated together with many of our present and former employees, students and closest partners. Among other events of the day, a talk show, with Mogens Nielsen as the well-spirited host, duly revived the early days of the department.

Academic and administrative reorganization

During 2011 Aarhus University went through an extensive change, merging nine faculties into four academic areas and 55 departments into 26 departments. Also, administration at central and faculty level was merged and divided in nine areas led by Deputy Directors. The department has only been slightly affected by these changes. The department keeps its English name, whereas the Danish name has been changed to “Institut for Datalogi”. The academic staff remains the same whereas two of the administrative staff members now are formally with the faculty administration. However, they still work at the department and do more or less the same job as before. The most substantial change has been the major uncertainty as well as lack of basic administrative services caused by the chaotic reorganisation of the administration. We look forward to a significant improvement in this area during 2012 and hope that the administration once again in an efficient and competent manner can support the departments in performing the core activities of the university. In this connection I would like to thank our administrative staff, who have succeeded in keeping a high level of service to our academic staff under very difficult conditions.

Strategic plan

We are in the process of drafting the strategic plan for 2012-2016. This work is well in progress, and we expect to present the final plan at the beginning of 2012. The plan covers a recruitment plan aiming at a much needed increase in the number of tenured academic staff to the effect that the department will have approx. 35 tenured academic staff members in 10 years compared to the current level of 25. Such an increase is needed to keep and improve the high academic level and production of the department. We have 4.2 % of the tenured academic staff at the Faculty of Science & Technology, producing 8.1% of all peer-reviewed papers, and we have 8.5% of the PhD students and almost 20% of the bachelor and Master’s
degree students. This impressive result gives rise to much respect from the other departments and faculty management.

Physical environment

The completion of the third step of the IT Park provides the department with an excellent physical environment – not in terms of a substantial increase in space but by enabling us to group our activities and staff in a better way and offer our students far better conditions. So from now on, our Master’s thesis students, for example, will have offices together with their respective research groups, and teaching rooms, study group rooms and space for studying will be available in the buildings with staff offices. Also, our new lecture hall with a capacity of 240 people enables us to hold even our major courses in the IT City.

Staff

In 2011, there have only been few changes in the permanent staff:

- Thomas Sangild Sørensen was given tenure as associate professor in medical image processing and simulation at 1 January 2011. HEALTH funds 50% of the position as partner. Thomas is head of the research group Computer Graphics and Image Processing.
- Mogens Nielsen returned to the department at 1 October 2011 after heading the PhD school of the faculty for a longer period of time but will be carrying out a number of tasks outside the department.
- Erik Meineche Schmidt has become chief adviser for the university management after resigning as dean and has his office at the department.
- Hanne Friis Jensen retired from her position at the information desk in the spring and was succeeded by Tina Rudolph.

Appointments and awards

- Christian S. Jensen: Willum Kann Rasmussen’s Annual Award for Technical and Scientific Research (one of the most prestigious Danish research awards).
- Lars Arge: member of Danish Academy of Technical Sciences.
- Susanne Bødker: member of Physical and Engineering Science Committee under the European Science Foundation.
- Kasper Green Larsen: EliteForsk travel grant, Ministry of Science, Innovation and Higher Education.
- Kasper Green Larsen, Thomas Dueholm Hansen and Ian Zerny: Google Fellowship Awards as part of funding of their PhD study.
- Rikke Bendlin and Sarah Zakarias: Google Anita Borg Memorial Scholarship.
• Olivier Danvy and Lasse Reichstein Nielsen: Most Influential Paper 10-Year Award at the 3rd International ACM SIGPLAN Conference on Principles and Practice of Declarative Programming for the paper: “Defunctionalization at Work”.
• Morten Bohøj, Niels Olof Bouvin and Henrik Gammelmark: Best Paper Award at the 11th International Conference on Web Engineering for the paper “AdapForms: A Framework for Creating and Validating Adaptive Forms”.
• Thomas Dueholm Hansen: Best Paper Award at the 52nd Annual IEEE Symposium on Foundations of Computer Science for the paper “Subexponential lower bounds for randomized pivoting rules for the simplex algorithm”.
• Kasper Green Larsen: Best Student Paper Award for the paper “On Range Searching in the Group Model and Combinatorial Discrepancy”.
• Barbora Micenkova: ACM SPY award for Best Master’s Thesis.

Research projects

During 2011 the department has inaugurated a new Danish National Research Foundation centre “Center for Theory of Interactive Computation” (CTIC). The centre is a partnership with the highly distinguished Tsinghua University in Beijing. The Danish part of the centre is headed by Peter Bro Miltersen, and the Chinese part is headed by Any Yao (recipient of the the Turing Award, the Nobel prize of computer science). Furthermore, the grant of the Danish National Research Foundation centre, MADALGO, has been extended for another five-year period after an excellent international review. Finally, the newly established Ubiquitous Computing and Interaction research group has been granted one of two projects under the Danish Council for Strategic Research, as part of the research theme “Intelligent Samfundsløsninger” (EcoSense).

Major grants starting 2011-12:

• Extension of grant, MADALGO, Danish National Research Foundation, Lars Arge, 36.2m DKK (starting 2012).
• CTIC, Peter Bro Miltersen, Danish National Research Foundation, 15m DKK.
• Collective Sensing and Macroscopic Analysis Methods for Reducing Company- and Society-level Environmental Footprints, Kaj Grønbæk, Danish Council for Strategic Research (DSF), 12.7m DKK (starting 2012).
• Basic Research in Cryptographic Protocol Theory, Jesper Buus Nielsen, ERC Starting Grant, 8.7m DKK.
• Static Analysis for Dynamic Languages, Anders Møller, Danish Council for Independent Research (DFF), Sapere Aude, 7.9m DKK.
• Basic Research in Cryptologic Protocol Theory, Jesper Buus Nielsen, DFF, Sapere Aude, 5.7m DKK.
• Tools for Rich Internet Applications, Anders Møller, Danish Council for Independent Research – Technology and Production Sciences (FTP), 4.8m DKK.
• Improving Decision Making from Massive Data Collections using Wall-sized, highly interactive Visualizations, Ira Assent, DSF, 4.4m DKK.
- A Geospatial Knowledge World, Christian S. Jensen, EU – FP7 Marie Curie, 4.3m DKK.
- Scalable and Effective Detection and Correction of Automatically Collected Data in e-Science, Ira Assent, FTP, 3.8m DKK.
- Reducing Environmental Footprint based on Multi-Modal Fleet management System for Eco-Routing and Driver Behaviour Adaptation, Christian S. Jensen, EU – FP7, 3.4m DKK.
- Annual Award for Technical and Scientific Research 2011, Christian S. Jensen, Villum Kann Rasmussen Foundation, 2m DKK.
- Den Digitale Sportsplads, Kaj Grønbæk, Fonden af 29. december 1967, 1.9m DKK.
- Lower bounds via Communication Complexity, Joshua Eric Brody, Danish Council for Independent Research - Natural Sciences (FNU) postdoc grant, 1.7m DKK.
- Cryptographic Protocols For Secure Computation, Claudio Orlandi, FTP, 1.7m DKK (starting 2012)

**Conferences, workshops and summer schools**

The department has hosted the following events over the year:

- Workshop on Synergies in Lower Bounds, 28 June – 1 July (Lars Arge, Kristoffer Arnsfelt Hansen, Peter Bro Miltersen).
- Summer School on High-dimensional Geometric Computing, 8 – 11 August (Gerth S. Brodal, Lars Arge, Peter Bro Miltersen).
- New Trends in Mechanism Design, 6 – 9 September (Peter Bro Miltersen).
- China Theory Week: Rumors and Connections – in practice and in future, 10 – 14 October (Peter Bro Miltersen).

In addition, the employees of the department have as usual attended lots of conferences, workshops, summer schools and meetings all over the world.

**Seminars**

During 2011 the department has arranged the following “Friday lectures”:

- Towards Hyper-Local Web Querying (Christian S. Jensen).
- Inaugural lecture for two new associate professors (Ira Assent and Thomas Sangild Sørensen).
- Augmented Reality – integrating digital information in the physical world (Kaj Grønbæk).
- Multi-surface applications: Development and Use (Clemens Nylandsted Klokmose, Cetrea A/S).
- Inaugural lecture for new professor in databases (Christian S. Jensen).
- Quantum Computing: A Great Science in the Making (Distinguished lecture of Chi-Chih Yao, Tsinghua University, Beijing).
- Applications on the Move (Niels Olof Bouvin).
- Robust Light Transport Simulation for Realistic Image Synthesis (Toshiya Hachisuka).
• You’re doing it wrong (Poul-Henning Kamp, independent consultant).
• The Three-Card Trick or: Why I Love Oblivious Transfer (Jesper Buus Nielsen).

Research dissemination

Each year the department hosts the computer Science Day event, where our research groups present their present research activities (cs.au.dk/csd2011). The event addresses our employees and students as well as outsiders with an interest in computer science research.

Dissemination for future students

Besides the ordinary visitor activities of the faculty, “Det Rullende Universitet”, study placement and “U-days”, the department arranges a number of events addressing young future students such as:

• Teaching a mathematics masterclass course on cryptology at the Science Talents centre in Sorø.
• Courses on robotics for upper secondary school students from the academy for talented young students (ATU).
• Together with DI-ITEK, the department arranged the Danish qualification tournament in World Robot Olympiad for more than 100 Danish upper secondary school students. At the finals in Abu Dhabi one of the Danish teams took 5th place out 25 teams in the “Open Category” competition for their age category.
• We offer student guidance for upper secondary school students in connection with study area projects.
• From 17 to 19 October the department hosted its 6th IT Camp for girls between the age of 15 and 19. 20 girls experienced some of the many opportunities the IT area has to offer through presentations and exercises in programming and cryptology.
• Together with It-vest and other Danish IT departments, the department participated in the annual Education Without Borders fair, which is held in five locations in Denmark. With more than 50,000 visitors, the education fair is the largest of its kind in Denmark.

Student activities

The department has approx. 1,000 students and two well-functioning student associations (DSAU and SOFA). They all help create one of the best study environments for IT students in Denmark.

• In June, the outcome of the final first year projects from our IT programme was presented, showing the students’ visions for the digital sports ground of the future.
• In July, 30 of our students visited Silicon Valley with funding from it-vest and the department. They visited among others, Stanford, D-School, Microsoft and IBM.
• In October, the department was one of two hosts for the Danish championship in programming. Seven of our students subsequently participated in the northwest European championship in Bremen.
• DSAU is behind a number of social and study-related activities for our students, such as “Crash Course in C” and DB2 certifying”.

Teaching

As shown in the graph below, the intake of bachelor students to our two bachelor programmes has once again increased. This means that we admit almost 20 % of all new students starting on a bachelor of science/technology at Aarhus University. The challenge will be to ensure that all these new students complete their bachelor degree. We are interested in experimenting with admission interviews for future intake to make sure that we take in motivated and competent students.

Over the year the department has produced the following number of degrees (brackets indicate production in 2010, 2009 and 2008):

- PhDs
  12 (15, 13, 9)
- Graduates
  Master Sc.: 40 (55, 60, 40)
- Bachelors
  Computer science: 55 (67, 54, 60)
  IT: 24 (22, 0,0)
Continuing education
Master: 11 (10,0,3)
Diploma: 3 (26, 0,2)

The decrease in diploma degrees is due the systematic effort in 2010 to help the large number of students who had almost completed their degree do so.

In the spring of 2011 we offered all new bachelor students study support reviews to discuss their study situation and help solve issues if any. This initiative was welcomed and will continue in future.

Through Datalogisk Uddannelsesforum (DUF), we have extended our contact and collaboration with the student associations for computer science and IT, and these associations will take further initiatives as to study environment and teaching.

Finally we have started preparing for the review of study programmes for bachelor and master degrees in computer science. However, a major review will not take place until the new structures for degree programmes of the university have been established.

Kurt Jensen
Head of Department